

REVIEW ARTICLES

Agency for Healthcare Research and Quality Evidence-based Practice Center methods for systematically reviewing complex multicomponent health care interventions

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Abstract

Objectives: The purpose of this Agency for Healthcare Research and Quality Evidence-based Practice Center methods white paper was to outline approaches to conducting systematic reviews of complex multicomponent health care interventions.

Study Design and Setting: We performed a literature scan and conducted semistructured interviews with international experts who conduct research or systematic reviews of complex multicomponent interventions (CMCIs) or organizational leaders who implement CMCIs in health care.

Results: Challenges identified include lack of consistent terminology for such interventions (eg, complex, multicomponent, multi-dimensional, multifactorial); a wide range of approaches used to frame the review, from grouping interventions by common features to using more theoretical approaches; decisions regarding whether and how to quantitatively analyze the interventions, from holistic to individual component analytic approaches; and incomplete and inconsistent reporting of elements critical to understanding the success and impact of multicomponent interventions, such as methods used for implementation the context in which interventions are implemented.

Conclusion: We provide a framework for the spectrum of conceptual and analytic approaches to synthesizing studies of multicomponent interventions and an initial list of critical reporting elements for such studies. This information is intended to help systematic reviewers understand the options and tradeoffs available for such reviews. © 2014 Elsevier Inc. All rights reserved.

Keywords: Evidence-based medicine; Complex interventions; Multicomponent interventions; Systematic reviews; Evidence synthesis methods; Reporting guideline; Complexity

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1. Introduction

The Agency for Healthcare Research and Quality (AHRQ)'s Effective Health Care program receives requests to synthesize evidence regarding the effectiveness and harms of complex multicomponent health care interventions, such as quality improvement, infection control, and health care informatics interventions. Systematic reviews of complex multicomponent interventions (CMCIs) provide clinicians, policymakers, and others with information about

What is new?

- Information addressing the challenges of systematic reviews of complex multicomponent interventions (CMCIs) is presented in one document.
- This information is a synthesis of the current literature and the practices of leading international experts.
- We provide a framework to consider when systematically reviewing CMCIs and analyzing the results.
- We provide an initial list of elements that should be reported in research reports and systematic reviews of complex multicomponent health care interventions.

the benefits and harms of interventions for decision making about implementation; however, because of their complexity, conducting reviews on multicomponent interventions is challenging.

A number of features distinguish CMCIs from other interventions such as devices or pharmaceuticals. First, CMCIs are commonly implemented at the level of an inpatient unit, outpatient clinic, hospital, or health system rather than individual patients. Because setting characteristics may interact with the intervention, it is critical to understand and enumerate those aspects that may modify the intervention's effects and synthesize the available interventions in context of those factors. Second, it may be uncommon for studies to examine identical combinations of components. This is particularly true as CMCIs evolve over time, and researchers add or remove components based on ongoing experience. Third, the "complexity" of CMCIs implies that the interventions cannot be reduced to the sum of their individual components but rather should be analyzed as "systems." This challenges reviewers to delineate essential from nonessential components. Ultimately, the generalizability and usability of findings from syntheses of CMCI studies may be limited unless the reviewer can address these challenges [1].

Our purpose was to outline approaches to the challenges of conducting systematic reviews of CMCIs as a step toward the development of guidance.

2. Methods

Information was gathered through two complementary activities: a literature scan and key informant (KI) interviews of researchers, systematic reviewers, and health systems leaders involved in the development or use of CMCI reviews. Detailed methods and results are in the full report [2].

3. Results

Challenges identified by both literature reviews and interviews include terminology used to describe CMCI studies, framing the reviews, searching for literature, study designs, analytic considerations, and reporting elements.

3.1. Terminology

The terminology used to describe CMCIs can present a hurdle for reviewers as the literature provides a variety of definitions for complex interventions (Table 1). The term complex captures many important concepts, but it is hard to imagine which actions, if any, it excludes.

It could refer to the intervention itself, the setting, the numbers of care specialties involved, patient comorbidities, or other facets.

KIs differed in their approach to terminology with some believing that complex and "multicomponent" can be used interchangeably, others feeling it critical to distinguish between them, and still others thinking that the term complex was not helpful and should be avoided. Most thought that any intervention could be considered complex in some way, making complex unnecessary if used only to describe the intervention itself. The word multicomponent, by contrast, was generally recommended to describe the intervention.

Another issue raised by KIs was lack of clarity about intervention component. Some view a set of educational efforts (eg, seminars, brochures, and Web sites) as a single component (education) rather than multiple. One KI considered components as either "fixed" or "variable." When the components always occur together, they are fixed and can be treated as a bundle. Normally, however, components are variable, meaning implementations may involve only some components. Labeling what may or may not be a component is not as helpful as understanding how the parts of an intervention have to fit together to exert an effect. In general, the lumping or splitting of components is topic depended and is left to the judgment of the reviewer.

3.2. Framing the review

A common first step in a review is to construct a framework and key questions that clarify the clinical logic, potential linkages, and information sought. Framing the CMCI review presents particular challenges as interventions may be defined at varying levels of granularity. CMCIs with the same general intent can include a range of components and activities. A class of interventions for a topic may include a type of intervention (eg, lifestyle modification) and may consist of several components (eg, support and education for nutrition, exercise, and psychosocial issues), each with varying activities (eg, for nutrition, weekly nutrition classes, and a food scale). In addition to specifying the nature of the intervention, systematic reviewers may need to consider other issues, such as core

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